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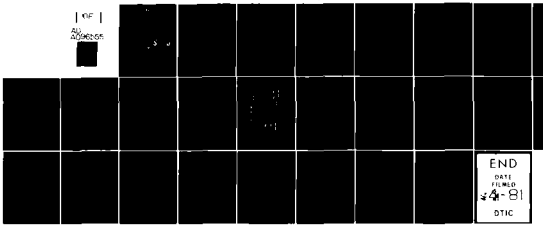

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THE STRATEGIC BALANCE IN TRANSITION: INTERPRETING CHANGES IN US–USSR WEAPONS LEVEL

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STRATEGIC STUDIES INSTITUTE
US ARMY WAR COLLEGE
Carlisle Barracks, Pennsylvania

THE STRATEGIC BALANCE IN TRANSITION: INTERPRETING CHANGES IN US—USSR WEAPONS LEVELS

by

Robert Kennedy

31 Oct 1980

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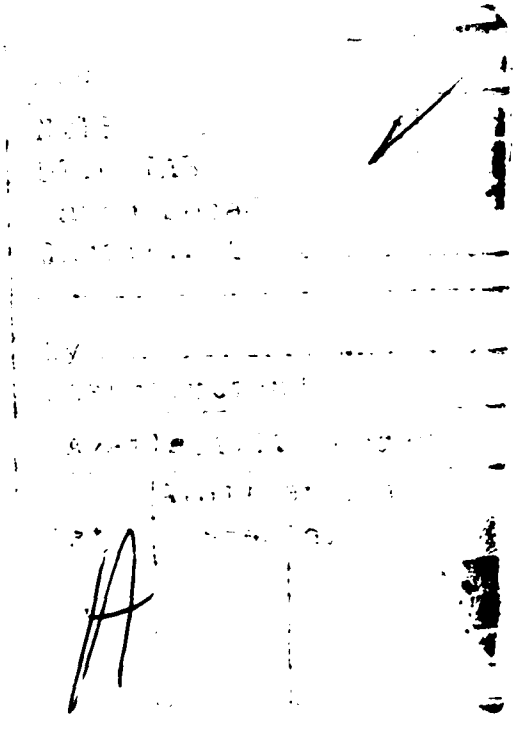

FOREWORD

This memorandum evalutes the contentions of a number of defense analysts concerning the strategic build-up of the Soviet Union. The author evaluates the arguments that the Soviet Union is seeking strategic superiority; the USSR will soon have the capability to execute a disarming first strike; and the appropriate US responses to growing Soviet capability should focus on the continued improvement of counterforce capabilities and the development and deployment of mobile or multiple aim point land-based missiles. He concludes that the United States must be concerned over growing Soviet capabilities; however, time remains to assess carefully all aspects of suggested alternatives and to further negotiate with the Soviet Union.

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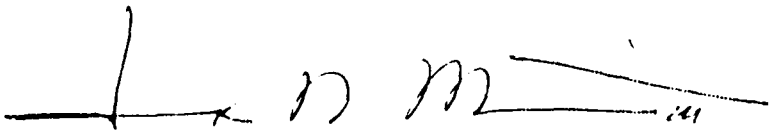
This memorandum was prepared as a contribution to the field of national security research and study. As such, it does not reflect the official view of the College, the Department of the Army, or the Department of Defense.



JACK N. MERRITT
Major General, USA
Commandant

BIOGRAPHICAL SKETCH OF THE AUTHOR

DR. ROBERT KENNEDY joined the Strategic Studies Institute in 1974. A graduate of the US Air Force Academy, Dr. Kennedy completed his graduate work in political science at Georgetown University. Dr. Kennedy served on active duty briefly with the Army and then with the Air Force from 1958 to 1971 and is currently a reserve officer with the Air National Guard. Prior to his present position, he was foreign affairs officer, US Arms Control and Disarmament Agency.

THE STRATEGIC BALANCE IN TRANSITION: INTERPRETING CHANGES IN US-USSR WEAPONS LEVELS

The phenomenal growth of Soviet strategic nuclear forces over the past two decades has raised questions among defense specialists concerning the motives which drive the Soviets in the acquisition of strategic nuclear capabilities and the implications of newly acquired Soviet capabilities for US security.

Prior to SALT I, a number of defense specialists attributed the Soviet strategic build-up to a desire on the part of the Soviet Union to attain parity with the United States. The continued expansion of Soviet strategic capabilities since SALT I, however, has been the subject of intense debate within the US national security community. Defense specialists remain divided over how the continued build-up should be interpreted: what are the underlying political and strategic objectives of the Soviet build-up and what are the potential consequences should the United States fail to respond.

Are the Soviets seeking strategic superiority? Are they attempting to secure a "visible preponderance of military power" exploitable during both peace and war? Will the United States soon

be confronted with the choice of retreat in crises or a nuclear war under grossly unfavorable terms? Such questions are the subjects of serious concern within the defense community, as are questions concerning appropriate US responses.

In recent years a number of defense analysts have concluded that, regardless of Soviet objectives, the balance of strategic forces has already begun to shift in favor of the Soviet Union. More alarming, however, is the view held by some that the Soviet Union is actively seeking strategic superiority and preparing for nuclear war; and that the Soviet preference for war-winning strategies will soon be reflected in a capability to destroy much of the US strategic retaliatory capacity through a preemptive first-strike. Such a capability, it is argued, not only will provide the Soviet Union with an advantage exploitable during crises, but also will adversely affect the ability of the United States to protect its interests and preserve its influence in the international arena in less-than-crisis circumstances.

In response to the continued increases in Soviet strategic capabilities, analysts believe it is now time for the United States to move rapidly in its development and deployment of mobile or multiple aim-point ICBM systems and to re-establish essential equivalence through the development of effective counterforce capabilities. Such capabilities, it is argued, will not only reduce the vulnerability of US strategic forces to first and follow-on attacks by the Soviet Union, but also preserve a relationship of parity at the strategic level.

This paper will examine the three aforementioned contentions: first, that the Soviet Union is seeking strategic superiority; second, that the USSR will soon have the capability to execute a disarming first-strike; and finally, that the appropriate US responses to growing Soviet capability should focus on the continued improvement of counterforce capabilities and the development and deployment of mobile or multiple aim-point land-based missiles.

SOVIET INTENTIONS

In recent years, the notion that the Soviet Union accepts American prescriptions for deterrence and stability and the tenet of parity such prescriptions presuppose has been seriously challenged by a number of defense specialists.[2] That the concern is now

reflected officially by elements within the US Government was revealed by the leaking of the National Intelligence Estimate (NIE) heavily influenced by "Team B."[3]

Before his retirement Major General George J. Keegan, Jr., as Chief of Air Force Intelligence, had apparently urged that a formal audit be conducted on every NIE produced since the first. He suggested that such an audit would reveal that, in fact, the intelligence community not only has consistently underestimated Soviet capabilities, but also had been wrong in its estimates of Soviet intentions.[4] He was apparently convinced that the Soviet Union was not only seeking strategic superiority,[5] but was preparing for an offensive war against the United States.[6]

While no formal audit was conducted, President Ford accepted the suggestion of his Foreign Intelligence Advisory Board, and a team of outsiders (the so-called Team B) with more pessimistic views of Soviet intentions was included in the 1976 estimate.[7] While the NIE was not completed without strong controversy, the conclusions were apparently unambivalent with respect to Soviet objectives. According to the newspaper reports, the NIE stated flatly that in the majority's view the Soviet Union is seeking superiority over the United States.[8] This judgment ran counter to all previous national estimates of Soviet intentions since 1950, which had apparently concluded that the Soviet Union was seeking rough parity.[9] It also appeared to contradict those who had argued that the Soviet Union had accepted some variant of MAD with its emphasis on deterrence and stability.

The NIE clearly reflected, in part, a number of the views Major General Keegan had been espousing as Chief of Air Force Intelligence. Writing in retirement Keegan underscored his belief that the Soviet Union structures its forces on a "totally different strategic philosophy than our own." He suggested that the USSR rejects the notion that nuclear war is unthinkable and that it believes it could survive a nuclear war and emerge with some margin of advantage.[10]

In the wake of his participation on Team B, Professor Richard Pipes has offered support for this view and has suggested that differences between American and Soviet strategies are traceable to different conceptions of the role of conflict and its inevitable concomitant, violence, in human relations and to the different functions which the military establishment performs in the two societies.[11] He contends that:

> The Soviet ruling elite regards conflict and violence as natural regulators of all human affairs: wars between nations, in its view, represent only a variant of wars between classes . . . .[12]

According to Pipes the strategic implication of such a view of conflict is a rejection by Soviet leadership of Western views that nuclear war is unthinkable and that the application of force is *prima facie* evidence of failure of rational analysis and patient negotiations. Rather, Pipes contends that the Soviet Union, following the classic Clausewitzian dictum, views war, even nuclear warfare, as politics pursued by other means.

Pipes further argues that support within the Soviet Union for large offensive forces and the Soviet rejection of the American theory of mutual deterrence is driven by a combination of political and institutional factors. He contends that, lacking a tradition and a popular mandate, the Soviet elite needs and wants large armed forces. He believes that such forces are the mainstay of the regime's authority and that at a time when its ideology is declining in appeal and its goods are noncompetitive in world markets, the Soviet Union sees large forces as a principal instrumentality of its external policies.[13] For this reason alone, Pipes argues,

> . . . the Soviet leadership could not accept the theory of mutual deterrence. After all, this theory, pushed to its logical conclusion, means that a country can rely for its security on a finite number of nuclear warheads and on an appropriate quantity of delivery vehicles; so that, apart perhaps from some small mobile forces needed for local actions, the large and costly traditional military establishments can be disbanded.[14]

Pipes also sees other reasons likely to compel Soviet strategists to reject the American notion of mutual deterrence. First, mutual deterrence does not acknowledge the potential instability resulting from technological breakthroughs which may neutralize a deterrent. Second, mutual deterrence is "passive." It threatens punishment to an aggressor after he has struck. It cannot prevent him from attacking. The latter objective requires an "active defense"--i.e., nuclear preemption. Third, the threat of a second strike may prove ineffectual.The side subject to a first strike may be deterred from retaliation by the threat of the enemy's third strike. Hence, Pipes contends that Soviet strategists "make no secret of the fact that they regard US doctrine . . . as second rate." They reject mutual deterrence, have concluded that nuclear war is feasible, and have adopted a strategic doctrine diametrically

opposite to that adopted by the United States. That doctrine calls for victory not deterrence, superiority not sufficiency in weapons, and offensive action not retaliation.[15]

Such judgments serve to remind us that Soviet strategic force planning is fashioned from a different set of predispositions which are a product of differing historical, ideological, and institutional influences and political-psycho-social needs. As a result, the USSR may not come to the same conclusions concerning defense requirements and strategic policies that we have come to in the United States. On this Fritz Ermarth has noted,

> Many of us have been quite insensitive to the possibility that two different political systems could deal very differently with what is, in some respects, a common problem.[16]

However, given an understanding of Soviet predispositions and differences in American and Soviet strategic doctrine (no matter how difficult to come by the latter may be), must one interpret the motives and objectives that drive current Soviet force postures and strategic weapons programs as Pipes and others have? Must one conclude that the Soviets reject the idea of deterrence, have concluded that nuclear war is feasible, and are actively preparing for or threatening war? Must one come to the conclusion as Dr. Colin Gray has—that the Soviet Union does not believe in "crisis stability."[17] Indeed, the weight of evidence in open Soviet literature suggests something quite different.

Soviet thinking on war has undergone an evolutionary process. Following the emergence of the Soviet socialist state, Communist dogma generally held that war between rival social systems was inevitable. Lenin underscored this point by writing,

> We are living not merely in a state, but in a system of states, and it is inconceivable for the Soviet Republic to exist alongside of the imperialist states for any length of time. One or the other must triumph in the end. And before the end comes there will have to be a series of frightful collisions between the Soviet Republic and the bourgeous states.[18]

Lenin further embraced the Clausewitzian dictum that war was a continuation of politics by other measures. Moreover, he saw war as a catalyst for the inevitable advance of socialism throughout the world.

The advent of the nuclear weapon, however, has had a substantial impact on Soviet thinking. By the mid-1950's concerns

were being expressed over the implications of the "inevitable conflict" in the nuclear age. In 1954 Malenkov wrote that nuclear warfare could result in the mutual destruction of both the capitalist and communist societies.[19] For Malenkov the awesome destructive potential of a cataclysmic conflict between communist and capitalist camps had apparently warranted serious reconsideration of the Leninist conception of war as precursor of world revolution.

While Khrushchev initially opposed Malenkov's unorthodox views, increasingly Khrushchev came to hold similar views concerning the dangers of nuclear conflict. In 1961 Khrushchev warned that "within 60 days of an atomic attack 500 million to 750 million people could perish" and concluded that "sober calculation of the inevitable consequence of nuclear war is an indispensable requirement for pursuing a consistent policy of preventing war."[20]

Since then, the avoidance of strategic nuclear conflict has been a central theme of Soviet policy.[21] Rather than being considered as an inevitable consequence of the struggle between differing social systems, war is no longer considered inevitable.[22] Rather than believing that nuclear war is a "feasible instrument" of policy, Soviet civilian and military analysts have come to view strategic nuclear conflict as an enormously dangerous endeavor with high potential for unprecedented disaster.[23]

Fritz Ermath has noted that:

> For a generation, the relevant elites of both the United States and the Soviet Union have agreed that an unlimited strategic nuclear war would be a socio-political disaster of immense proportions.[24]

Likewise, the Soviet delegation, in a prepared statement presented at the first business meeting of the two SALT delegations in Helsinki in November 1969 expressed the official Soviet view that:

> Even in the event that one of the sides were the first subjected to attack, it would undoubtedly retain the ability to inflict a retaliatory strike of crushing power. Thus, evidently, we all agree that war between our two countries would be disastrous for both sides. And it would be tantamount to suicide for the ones who decided to start such a war.[25]

What then is it that accounts for the substantial differences in American and Soviet force postures and strategic doctrine? Dennis Ross, currently with the Department of Defense's Office of Net Assessment, contends that:

> The fact that there is a general distinctiveness between Soviet strategic nuclear doctrine and American deterrence perspectives . . . should not be taken to mean that deterrence is not the Soviet military's primary mission.[26]

Ross argues that while the United States has adopted an approach to deterrence based on the promise of punishing an aggressor should deterrence fail, the Soviet Union has opted for deterrence through denying the enemy any possibility of a military success.[27]

Holding a similar, although not entirely identical view, Robert Legvold, a Senior Fellow of the Council of Foreign Relations, has written:

> For the Soviet Union, [deterrence] is a residual concept, an effect produced by performing other primary tasks well, tasks involving a deft foreign policy and a carefully prepared defence.[28]

Indeed, rather than signaling a rejection of deterrence as Pipes and others have suggested, current Soviet force postures and strategic doctrine reflect a different approach to deterrence and strategic planning. Soviet theoreticians view complex American concepts of deterrence, extended deterrence, limited nuclear options, interwar deterrence, and deescalation as an attempt to impose on a potential adversary those rules of crisis and conflict behavior that would maximize advantages enjoyed by the United States at a given moment while minimizing the capabilities of an adversary.[29] However, they see such American concepts as a series of "dogma and canons" based on "faith," rather than "realistic concepts and theories" founded on "facts or experience."[30] Moreover, they consider such concepts as dangerously destabilizing. Instead of controlling escalation during crisis or conflict, they see Western concepts of deterrence, interwar deterrence, limited nuclear options, and deescalation as making the use of nuclear weapons more likely and thus contributing to the potential for a devastating nuclear exchange which both they and the United States wish to avoid.

Thus, Soviet elites have rejected specific American conceptualizations of deterrence and have concluded that deterrence of nuclear conflict is best served by strategic doctrines and carefully prepared strategic forces which promise to deny a potential aggressor any hope of success through the use of nuclear weapons. Such a deterrent demands not only an active capacity to attack the enemy's warfighting capability, but also an ability to

limit damage to oneself through home defense measures.

Such an approach to deterrence is not totally unlike the approach so often advocated in the 1950's and early 1960's in the United States.[11] Moreover, it is congruent with Soviet ideological predispositions. The Soviet Union believes nuclear war is possible so long as "imperialism" exists. Marxist-Leninist dogma considers "capitalism" inherently hostile to socialism. While Soviet leaders have discarded the Lenin/Stalin views concerning the inevitability of conflict, they believe that the "imperialists" may become desperate as they are increasingly confronted with socialist successes, and unleash a nuclear war, believing they can reverse the course of history.

Deterrence through denial is also congruent with the political and institutional pressures for large armed forces and conceptually consistent with traditional military approaches to potential conflicts. On the first point, forces required to insure deterrence through punishment can be sized and thus limited to those necessary to inflict a specific degree of punishment. Forces required for a denial strategy are likely to be more open ended, always requiring a greater quantity than the most pessimistic estimates of the adversary's future capabilities. On the second point, a deterrent posture that calls for war-winning and damage-limiting capabilities is consistent with traditional military missions of ensuring success in warfare and protecting populations and government structures.

To argue that the Soviets reject nuclear warfare as a "feasible" instrument of policy and consider deterrence of nuclear conflicts as a principal military objective is not to suggest that they reject the notion that strategic superiority, or the appearance of superiority, may yield tangible political benefits. In 1974 James R. Schlesinger, then Secretary of Defense, expressed his concern on this issue in his annual posture statement to Congress. Speaking about the growing numerical superiority of Soviet strategic forces he stated:

> Whether the Soviets believe that with the shift in these indicators they have achieved any meaningful, exploitable, advantage is not clear. However, they have not been reticent in stressing to a variety of audiences their superiority over the United States in numbers of ICBMs and other strategic capabilities. Their words, at least, have suggested that they see these asymmetries as giving them diplomatic if not military leverage.[12]

In recent years the Soviets have denied that they are seeking a strategic superiority. General Secretary Brezhnev, in a major policy speech at Tula added his voice to the disavowals.

> Of course, comrades, we are perfecting our defenses. It cannot be otherwise. We have never sacrificed and will never sacrifice the security of our country, the security of our allies. But the allegations that the Soviet Union is going beyond what is sufficient for defense, that is striving for superiority in armaments with the aim of delivering 'the first strike' are absurd and totally unfounded.'[1]

While Soviet leaders may not be actively seeking strategic superiority in terms of a military capability to execute a comprehensive preemptive first strike (indeed many Soviet theorists contend that given the diversity of forces available to the United States, such a capability is unattainable), they do believe that the United States enjoyed a measure of political leverage during the period of its unquestioned strategic superiority. Today, the Soviet Union is a major power seeking to preserve and extend its interests throughout the world. Given the historic Soviet emphasis on military power as a foreign policy tool, it is likely that the Soviet Union will attempt to extract what foreign policy benefits might be derived from relative improvements in its strategic posture vis-a-vis the United States—whether such relative improvements are the result of independent third party appraisals or are created by the cycle of concerns over Soviet capabilities honestly generated in the United States.

Moreover, to argue that the Soviets emphasize deterrence is not to suggest that a deterrence which relies on damage limitation and an active capacity to attack the enemy's warfighting capabilities is nonthreatening. Indeed, one of the principal concerns is that Soviet leaders may come to believe that they could successfully eliminate a large portion of the US retaliatory capability before it is launched and could reduce damage to the Soviet Union to acceptable levels through civil and air defense measures. During a severe crisis, when confronted with what they perceive as an imminent strategic exchange, these same leaders might be tempted to initiate a conflict that otherwise might have been avoided.

Soviet emphasis on the deterrence of nuclear war, however, does suggest some interests shared in common with the United States. Such interests can provide a basis for continued discussions not only on further limits on strategic nuclear forces, but also on strategic doctrine and force structures aimed at achieving a more stable strategic environment.

SOVIET CAPABILITIES

A number of defense specialists have become concerned that the Soviet Union, regardless of its intentions, now has or will soon have a strategic first-strike capability. Former Secretary of Defense Schlesinger expressed his concern over the growing threat posed to US ICBMs as a result of expected improvements in Soviet missile forces,[34] as have a number of others since then. Perhaps the most alarming view was offered in the fall of 1976 by Professor R. J. Rummel. Rummel argued that, as a result of continually expanding Soviet military capabilities, the Soviet Union, by 1980, would have a "preclusive first strike" capability; that is, they would be physically capable of attacking our strategic forces and destroying our retaliatory capability.[35]

Indeed, the growth of Soviet strategic capabilities has been dramatic over the last decade or so. According to Defense Department calculations, the Soviet defense establishment has expanded by over a million men and the Soviet Union has added more than 1,000 ICBM launchers and more than 900 modern submarine-launched missile (SLBM) tubes to their strategic nuclear forces.[36] Prior to SALT I (which fixed levels of ICBM and SLBM launchers), the only Soviet force component in which there was a reduction (however slight) was in bombers. Other force components increased many fold (see Table I).

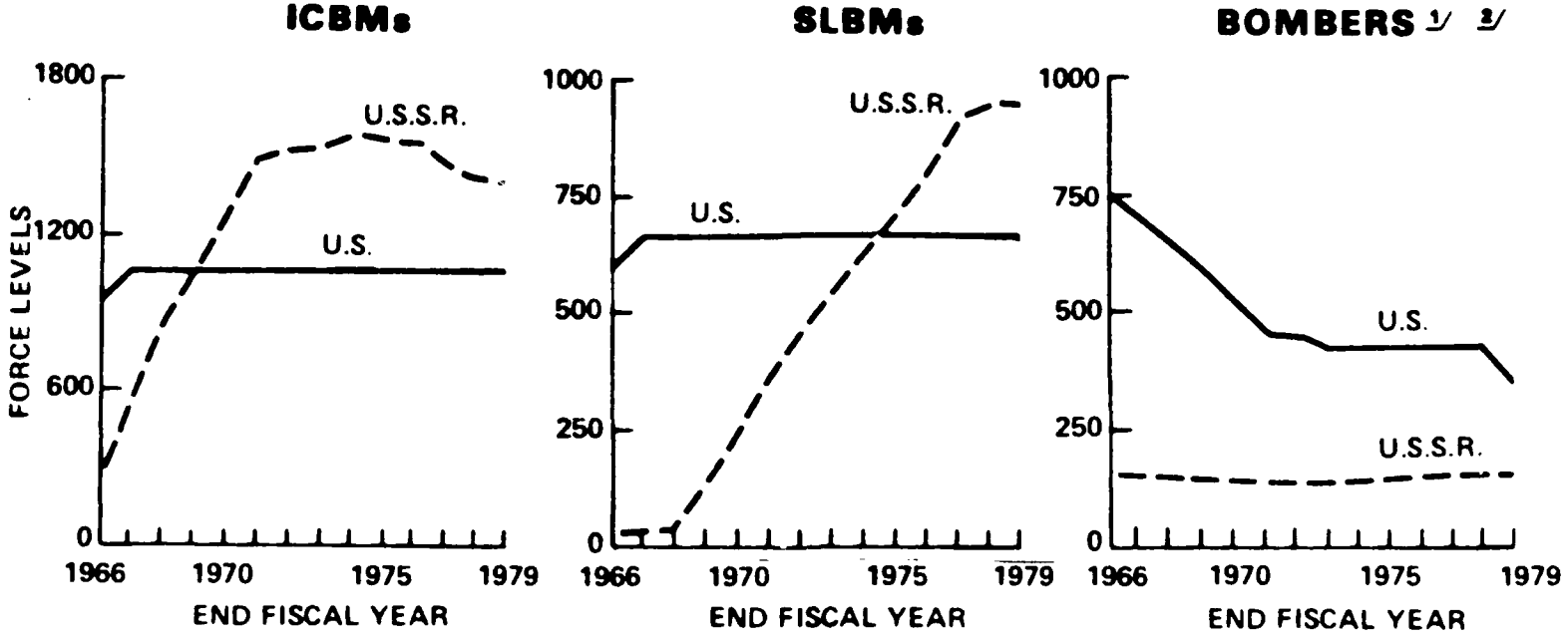
Despite such increases in force levels, US technological advantage has permitted the United States to field many more warheads—in all force categories (see Table II).

In recent years, however, such static measures of the US-Soviet balance have been increasingly faulted as unrepresentative of the true status of relative capabilities. The MIRVing of the Soviet and American missile forces, the development of large throw-weight missiles by the Soviet Union, the hardening of missile silos, increases in accuracy, and a host of other factors seem to render less important absolute measures of static capabilities. Moreover, concern over the potential for a successful Soviet "first-strike," arising from Soviet technological improvements in accuracy and the MIRVing of Soviet heavy throw-weight missiles, has focused attention on a relatively new parameter: the K factor, or countermilitary potential (CMP). K is a measure of lethality.

In theory, the lethality of a given missile against a given target is a function of four factors: the number of warheads the missile is

TABLE I

CHANGES IN U.S./U.S.S.R. STRATEGIC LEVELS

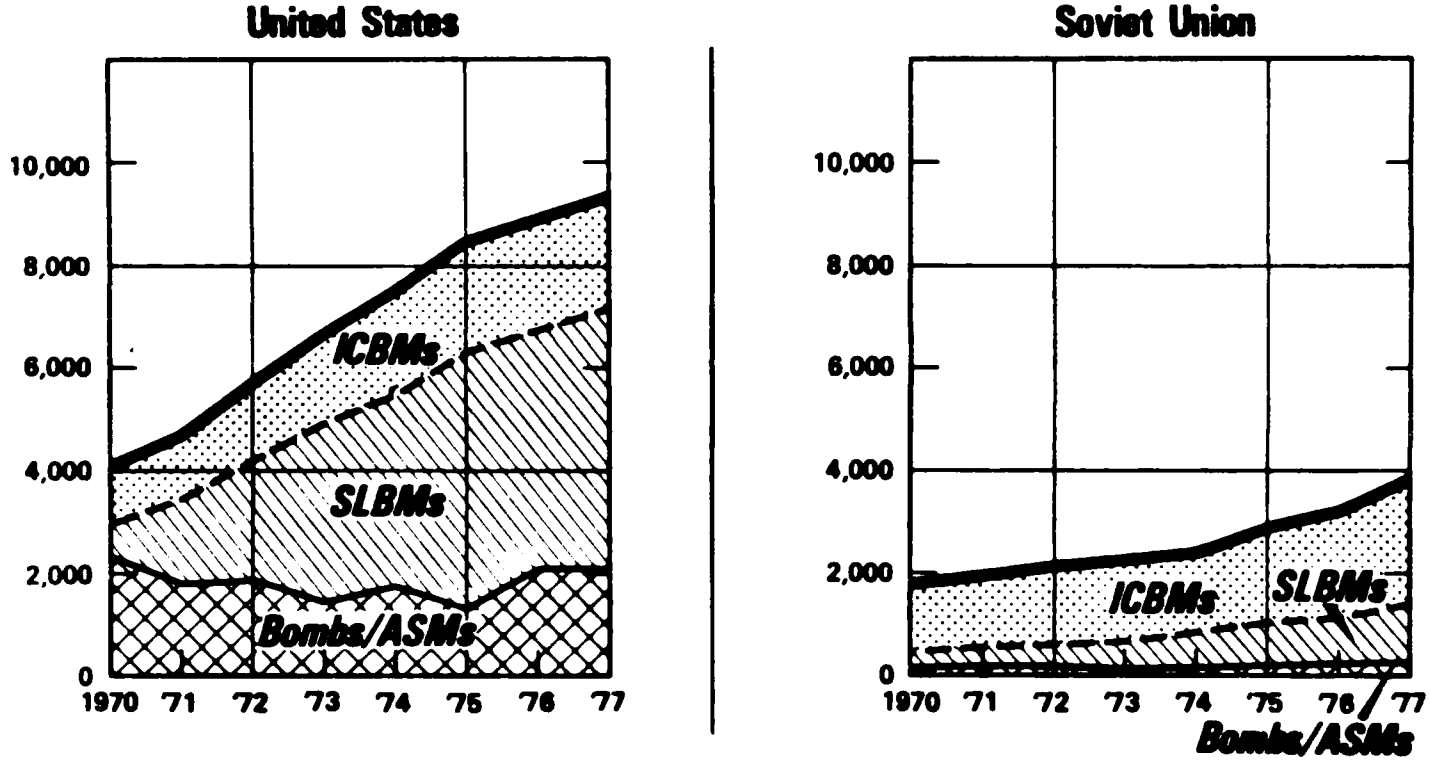


Source: Department of Defense Annual Report Fiscal Year 1981 (Washington, DC: Department of Defense, January 29, 1980), p. 75.

Notes: 1/ FB-111 and BACKFIRE are excluded.
2/ Excludes approximately 220 B-52's in deep storage.

TABLE II

NUCLEAR WEAPONS



Source: John M. Collins, American and Soviet Military Trends Since the Cuban Missile Crisis (Washington, DC: Georgetown University, 1978), p. 112.

capable of delivering, the energy (yield in megatons) released by the warheads, the accuracy of the warheads, and the hardness of the target. According to Kosta Tsipis, physicist and Associated Director of the Program in Science and Technology at the Massachusetts Institute of Technology, three of these four factors describe the characteristics of the missile itself. These three factors Tsipis called *Kn* of the missile's cumulative destructive potential. Thus, if a country has *m* missiles, the product $Knm = KN$[37] is a direct measure of the destructive potential of its strategic missile force. Tsipis noted that when the fourth factor, target or silo hardness, is considered, it is possible to determine the destructive potential required to destroy a single silo of a particular degree of hardness within a given probability (*Ks*).[38] Tsipis called the cumulative destructive potential required to destroy all the missile silos of a given country *KS*.

In 1975 Tsipis calculated the total countersilo kill capacity needed to destroy, within a given probability (P = .97), all US silos (KS = 82,080) and all Soviet silos (KS = 40,000). Furthermore, he calculated the total countersilo kill probably possessed by the Soviet Union (KN = 8,864) and the United States (KN = 21,768). He concluded that neither the Soviet Union nor the United States had the capability to destroy, with their ballistic missiles alone, the land-based ICBM force of the other country with any reasonable probability.[39]

Rummel faulted Tsipis for his optimistic analysis based on the assumption of poor accuracy for Soviet missiles (Tsipis used a CEP of 1 nm or more for all Soviet missiles). Rummel contended that, based on Department of Defense information, it was believed that the Soviets had achieved or would soon achieve accuracies of 500-700 meters.[40] He concluded that, as a result of improvements in the accuracy of its missiles, the Soviet Union would have KNs of about 80,000 in 1980, 200,000 in 1981, and 800,000 in 1985. With such capabilities they not only could destroy in a preemptive fashion all but a few (◄12) US ICBM's, and 80 percent of our bombers, but also could hold a sizeable force in reserve to threaten US cities. Accordingly to Rummel surviving US ICBM, SLBM and bomber forces would be insufficient to retaliate effectively against the Soviet Union in light of improving Soviet civil and air defenses. Under such conditions, the United States might be deterred from retaliating. Thus the Soviet Union not only would have attained a

first strike capability, but also would have achieved a psychological advantage exploitable during crises or conflict.[41]

An analysis of the evidence at hand supports neither the pessimistic views of Rummel nor the optimistic views expressed by Tsipis in 1975. Today, as for Tsipis in 1975, neither the Soviet Union nor the United States possesses sufficient countersilo kill capability (see Table III) to destroy the other's ICBM forces with any reasonable probability of success (see Table IV and V). However, the Soviet Union (assuming improvements in accuracy) and the United States (assuming MX or MARV) could both theoretically have weapons of sufficient accuracy and yield to destroy a large portion of the other's ICBM force in a preemptive counterforce first strike (see Tables VI, VII, and IV) in the not-too-distant future.[42]

Such aggregate calculations, however, do not necessarily indicate that one or the other side will possess an operational capability to destroy the other's strategic retaliatory forces or that in a crisis the side with such a capability would be in a position to exert a degree of coercive diplomacy or might be tempted to launch a preemptive first strike. Of the host of variables which affect the ability of the Soviet Union to execute, with a high degree of assurance of success a preemptive first-strike, K factor calculations only consider numbers of warheads, yield, degree of silo hardness, and accuracy. Moreover, even if the Soviet Union could destroy a large portion of the US ICBM and bomber forces, serious questions remain concerning whether or not Soviet civil defense efforts would be sufficient to preclude an effective assured retaliation by US SLBM forces.

Concerning the first point Tsipis has noted,

> The mere fact that the total K x N of one country may be larger than the K x S of an opponent does not necessarily guarantee that the first country can destroy with certainty all the silo-based missiles of the second, because additional parameters such as reliability of reentry vehicles, the timing of their arrival against a silo, the characteristics of a silo and the type of soil it is in may affect the lethality of a warhead. . . .[43]

John Steinbruner, Thomas Garwin, and Michael Nacht in excellent efforts have added significantly to the public debate by detailing a number of such constraints that scientists and soldiers confront when trying to compute vulnerabilities or probabilities of silo destruction. Steinbruner and Garwin have suggested, "calculations

about overall performance [of ICBM's] under actual combat conditions must be projected from data on single components under highly unrepresentative test conditions."[44] They point out

TABLE III

CURRENT COUNTERSILO KILL CAPACITY (KN)

MISSILE	YIELD	CEP	K	n	m	KN
		UNITED STATES				
Titan	5	.5	11.7	1	54	632
MM II	1	.3	11.1	1	450	4995
MM III	.17	.2	7.7	3	550	12705
US TOTAL						18332
		SOVIET UNION				
SS-9 (Mod 1)	18	.7	14.0	1	60	840
(Mod 2)	25	.7	17.4	1	70	1218
(Mod 3)	4	.7	4.2	3 (MRV)	60	756
SS-11 (Mod 1)	1	1	1.0	1	390	390
(Mod 3)	.1	1	.2	3	390	47
SS-13	1	.7	2.0	1	60	120
SS-17 (Mod 1)	.9	.25	14.9	4	30	1788
(Mod 2)	5	.25	46.8	1	30	1404
SS-18 (Mod 1)	18	.25	109.9	1	55	11390
(Mod 2)	.6	.25	11.4	8	55	5008
SS-19 (Mod 1)	.55	.25	10.7	6	100	6444
(Mod 2)	5	.25	46.8	1	100	4680
USSR TOTAL						34085

Sources: Information on missile yields and number of warheads is from The Military Balance 1978-1979 (London: International Institute for Strategic Studies, 1978), pp. 80-81. Yields for the SS-18 (Mod 2) and SS-19 (Mod 1) have been revised downward to reflect an apparent downgrading by the intelligence community of yield estimates for these two systems. See Walter Pincus, "US Downgrades Soviet ICBM Yield," The Washington Post, May 31, 1979, p. A-11. The totals for each Soviet missile (m) as reported by the IISS, have been distributed equally among the various missile modifications. CEPs (not available in The Military Balance), are those which appeared in Representative Robert L. Leggett, "Two Legs Do Not A Centipede Make," Armed Forces Journal, February 1975, p. 27. For CEPs on the newer missiles (not covered in Leggett's work), those suggested by Jan Lodal, "Assuring Strategic Stability: An Alternate View," Foreign Affairs, Vol. 54, April 1976, p. 465, have been used.

Symbols: CEP = circular error probable (accuracy); K = yield 2/3 /CEP^2, n = number of warheads per missile; m - number of missiles; KN = Knm.

TABLE IV

COUNTERSILO KILL CAPACITY (KS)
NEEDED TO DESTROY ALL US SILOS

Missile	H*	S	Kn@ P_k=.97	KN@ P_k=.90
TITAN	300	54	2,444	1,605
MM II	300	450	20,366	13,373
MM III	1,000	550	59,787	39,260
TOTALS		1,054	82,597	54,238

Source: Derived from Kosta Tsipis, "Physics and Calculus of Countercity and Counterforce Nuclear Attacks," Science, Vol. 187, February 7, 1975, p. 395.

Symbols: H=silo hardness (psi); S=number of silos; P_k=probability of success; $KS = 2H^{2/3} \lfloor \bar{f}(H) \rfloor^{2/3} \lfloor \bar{L}n(1-P_k S) \rfloor$

*Data on the hardness of US silos is usually classified. For convenience sake the figures offered by Tsipis have been used throughout this paper.

TABLE V

COUNTERSILO KILL CAPACITY (KS)
NEEDED TO DESTROY CURRENT SOVIET SILOS

Missile	H*	S	Kn@ P_k=.97	KN@ P_k=.90
SS-9	100	190	3,732	2,451
SS-11	300	780	35,301	23,180
SS-13	300	60	2,715	1,783
SS-17	1,000	60	6,522	4,283
SS-18	1,000	110	11,957	7,852
SS-19	1,000	200	21,741	14,276
TOTALS		1,400	81,968	53,825

Symbols: H = silo hardness (psi); S = number of silos; P_k = probability of success; $KS = 2H^{2/3} \lfloor \bar{f}(H) \rfloor^{2/3} \lfloor \bar{L}n(1-P_k S) \rfloor$

*No data is available on Soviet silo hardness. All SS-9's are assumed to be soft. All SS-11's and 13's are assumed to be upgraded to 300 psi and all newer missiles are assumed to be hardened to 1,000 psi.

TABLE VI

FUTURE COUNTERSILO KILL CAPACITY (KN)

Missile	Yield	CEP	K*	n	m	KN	KN_a**
			UNITED STATES				
TITAN	5	.5	11.7	1	54	632	632
MM II	1	.3	11.1	1	450	4,995	4,995
MM III***	.35	.1	49.7	3	350	52,185	52,185
MX	.35	.1	49.7	10	200	99,400	99,400
US TOTALS							157,212
MM III (MARV)	.35	.02	1241 (150)	3	350		147,500
MX (MARV)	.35	.02	1241 (150)	8	200		300,000
TOTALS WITH MARV							457,500
			SOVIET UNION				
SS-11 (MOD 1)	1	.1	1.0	1	100	100	-
(MOD 3)	.1	1	.2	3	100	60	-
SS-13	1	.7	2.0	1	60	120	-
SS-17 (MOD 1)	.9	.15	41.4	4	175	28,980	28,980
(MOD 2)	5	.15	13.0	1	175	22,750	22,750
SS-18 (MOD 1)	18	.15	305 (150)	1	150	45,750	22,500
(MOD 2)	.6	.15	31.6	8	150	37,920	37,920
SS-19 (MOD 1)	.55	.15	29.8	6	245	43,806	43,806
(MOD 2)	5	.15	130	1	245	31,850	31,850
USSR TOTALS						211,336	187,806

Sources: Information on missile yields and number of warheads is from The Military Balance 1978-1979 (London: International Institute for Strategic Studies, 1978), pp. 80-81. Yields for the SS-18 (MOD 2) and SS-19 (MOD 1) have been revised downward to reflect an apparent downgrading by the intelligence community of yield estimates for these two systems. See Walter Pincus "US Downgrades Soviet ICBM Yield," The Washington Post, May 31, 1979, p. A-11. CEPs which are not carried in Military Balance are those presented in Representative Robert L. Leggett, "Two Legs Do Not A Centipede Make," Armed Forces Journal, February 1975, p. 27. The future CEP of Soviet SS-17, 18, and 19 missiles is that suggested by Jan Lodal, "Assuring Strategic Stability: An Alternative View," Foreign Affairs, Vol. 54, April 1976, p. 465. The future CEP and yield of MM III are those presented in The Defense Monitor, Vol. VII, September-October 1978, p. 2.

*Figures in parentheses for K represent the maximum K used for calculation. Since a K of 142 is sufficient to destroy a silo hardened to 1000 psi at P_k of .99, all K over 150 can be considered of little relevance and would distort total KN calculations.

**Kn_a, or KN adjusted, excludes KN resulting from missiles such as the Soviet SS-11s and SS-13s not likely to be employed against hardened targets, and takes into account the usable upper limits of K. Thus KN_a is calculated using K values up to a maximum of 150.

***For purpose of these calculations, all MM III are assumed upgraded with MK 12A warheads and NS-20 guidance systems. See The Defense Monitor, Vol. VII, September-October 1978, p. 2.

****All SS-9s are assumed to be replaced by SS-18s. All but 200 SS-11s are assumed to be replaced by SS-17s and SS-19s. Numbers of Soviet missiles are assumed to be equally divided between the various MODs.

TABLE VII*

COUNTERSILO KILL CAPACITY (KS)
NEEDED TO DESTROY ALL FUTURE SOVIET SILOS

Missile	H**	S	KN@ P_k=.97	KN@ P_k=.90
SS-11	300	200	9,051	5,944
SS-13	300	60	2,715	1,783
SS-17	1,000	350	38,046	24,983
SS-18	1,000	300	32,611	21,414
SS-19	1,000	490	53,265	34,976
TOTALS		1,400	135,688	89,100

Symbols: H = silo hardness; S = number of silos/ P_k = probability of success;
$KS = 2H^{2/3} \lceil \overline{1}(H)\overline{\rceil}^{2/3} \lceil \overline{\mathrm{Ln}}\ (1-P_k\ S)\overline{\rceil}$

*Table assumes all SS-9's have been replaced by SS-18's and all but 200 SS-11's have been replaced by SS-17's and SS-19's.

**No data on Soviet silo hardness is available. It is assumed that all older silos are hardened to 300 psi and silos upgraded to accommodate the newer missiles are hardened to 1,000 psi.

that as far as is known from the public record the Soviet Union has never exploded a nuclear warhead at the end of an intercontinental missile flight, has never fired a strategic missile on short notice from an operational silo randomly chosen, and has never fired more than a few missiles simultaneously or in close coordination.

In this vein, Steinbruner and Garwin cite a host of factors which affect the ability of a missile to destroy its target which they have grouped into two broad categories: reliability and interference. Reliability includes the dependability of the missile during the boost and postboost phase. Interference generally refers to the effect on the warhead during the reentry phase resulting from previous warhead detonations. This includes the effects generated by the electromagnetic pulse (EMP), the violent movement of air near the explosion which persists for a considerable length of time and can deflect an incoming warhead off target, and the large amounts of debris that rise rapidly into the upper atmosphere which can seriously affect the accuracy of an incoming warhead. In fact, where more than one warhead is required to achieve a high degree of confidence that a missile has been destroyed in its silo, the debris from previous blasts may pose an insurmountable targeting problem.

Michael Nacht has also questioned assumptions which are implicit in conclusions derived from calculations based on the four above mentioned variables. In addition to the interference effect (sometimes called fratricide), Nacht noted several other variables which render difficult countersilo kill calculations—the terrain in which the silo is located, the amount of radiation visited on the silo, the weather at time of detonation, and the duration and intensity of both cratering and ground shock that follow the detonation. Moreover, Nacht argued that, because the earth's nonuniform spericity produces gravitational variation that could have an uncertain effect on the ballistic trajectories of warheads fired from different launch points to different targets, perhaps more uncertainty about the precise values for particular delivery CEP's is justified than is generally reflected in the literature.[45]

Such variables as those mentioned by Tsipis, Steinbruner, Garwin, and Nacht make it difficult to determine with any high degree of confidence the probability of launching a successful countersilo first-strike.

On the second point, civil defense preparedness is often used to indicate a distinct Soviet advantage in event of nuclear exchange. It is often contended that in the wake of a Soviet counterforce first-strike, US retaliatory forces would only kill about ten million people or about one-half the losses sustained by the Soviets during World War II. As a result of such calculations, we are asked to believe that our ability to deter a Soviet first-strike is rapidly deteriorating since the Soviet Union might be willing to initiate or threaten a nuclear war under conditions in which forecast Soviet losses might be less than those experienced during World War II.

The first test of such a proposition lies in the strength of the analogy. Is it reasonable to expect Soviet leaders to initiate a conflict in which, at the outset, they are assured of ten million fatalities? It is one matter to find oneself engaged in a conflict, not of one's choosing, in which over the course of 5 years, twenty million casualties are absorbed in the defense of the homeland. It is quite another matter to consciously decree a conflict in which a minimum of ten million fatalities can be expected within the first few hours of conflict and all major cities would be destroyed along with, perhaps, the fabric of Soviet society.

Moreover, the ten million deaths suggested not only fail to account for those additional fatalities likely to result through military action should war continue beyond the first day, but also

do not include the millions of fatalities, or losses likely to result from fallout, disease, starvation, and societal chaos which would certainly follow a strategic nuclear exchange.

Additionally, the notion that the Soviet Union could exercise a degree of coercive diplomacy knowing that it might sustain as few as ten million casualties is misleading. Any attempt at coercion through the threat of nuclear war would provide the United States an important measure of warning for its strategic and forward-based forces. Warning would enhance US force survivability, increase its destructive potential, and hence, significantly increase the casualties likely to be suffered by the Soviet Union should a conflict occur. US bomber forces might be placed on airborne alert or laterally dispersed to a wide variety of airfields. On airborne alert they would remain essentially invulnerable to preemptive attack, while lateral dispersal would seriously compound the Soviet targeting problem. Ballistic missile submarines which are in port could be put to sea. Forward-based forces, particularly aircraft, might be vertically or laterally dispersed. The President might even consider authorizing the launch "under attack" of the ICBM force. Under such circumstances, the apparent conservative nature of Soviet defense planning is likely to induce Soviet specialists to make force exchange calculations which are not likely to be outweighed by the benefits of threatening or initiating a strategic nuclear conflict. Fritz Ermath has noted that:

> On the whole it appears that Soviet defense planners and force balance assessors are much more sensitive than we are to the subtleties and uncertainties—what we sometimes call 'scenario dependencies'—of strategic conflict seen from a very operational perspective.[46]

The above analysis suggests that rather than in delicate balance over sharp fulcrum, US and Soviet strategic force capabilities are counterpoised on a broad base of uncertainties which permits a number of force alterations on either side without cataclysmic result. Thus, while increases in accuracy will make Soviet missiles more lethal, such technical improvements are not likely to be easily translated into operational and political advantages which can be readily exploited by the Soviet Union in time of crises or conflict. Nevertheless, both US and to a lesser degree Soviet ICBM forces are becoming more vulnerable to preemptive attack. The question confronting the United States today is how to respond to this increasing vulnerability. Should the United States abandon the

land-based missile leg of the strategic TRIAD? Should it adopt the Soviet deterrent strategy and seek an active capacity to attack Soviet war waging capabilities? Or should it adopt a less vulnerable form of land-based basing such as that suggested by the MX program?

THE US RESPONSE

There is nothing sacrosanct about the TRIAD of US strategic forces—ICBMs, bombers, and SLBMs. Indeed, some defense specialists have suggested that growing vulnerabilities of certain US strategic systems eventually may force the United States to abandon the TRIAD concept in favor of a Dyad (bombers and SLBMs), perhaps even a monad (SLBMs alone). Nevertheless, the abandonment of the ICBM leg of the TRIAD would not come without cost. The current diversity of strategic forces (land, sea, and air) serves synergistically to enhance the utility of America's deterrent forces.

First, diversity provides a hedge against technical surprise that might render one or even two legs totally vulnerable to preemptive attack. Second, force diversity poses attack timing problems which make it difficult for the Soviets to coordinate attacks in all three legs of the TRIAD simultaneously.[47] Third, diversity provides a hedge against tactical surprise by offering an opportunity not only to place bomber forces on airborne alert where they are virtually invulnerable to preemptive attack, but also to reduce the vulnerability of the sea-based forces. Finally, force diversity dilutes the ability of the Soviets to successfully defend against retaliatory strikes.

Moreover, the fixed-site ICBM leg of the TRIAD has been considered especially useful since ICBMs are very accurate, easily secured from sabotage, immediately available for limited or general war options, relatively inexpensive to maintain, and have a relatively secure C^3 (command, control, communications) net.

On the other hand, in light of potential improvements in Soviet hard target kill capability, the United States will be faced with a number of difficult choices if it wishes to preserve the ICBM leg of the TRIAD. It may choose, under the rubric of essential equivalence, to improve its counterforce capabilities as the Soviets improve theirs. This certainly would enhance its ability to "root-out" certain hardened military and industrial targets in a second

strike. However, in the absence of a willingness to launch its strategic forces in preemption, improving counterforce capabilities will not solve ICBM vulnerabilities.

The United States could adopt a preemptive posture. Such a posture might solve the problem of growing vulnerabilities; however, it would diminish, not enhance, crisis stability. In a severe crisis, each side fearing a preemptive counterforce attack by the other might well be forced to a preemptive action of its own rather than chance losing a substantial portion of its retaliatory capability.

The United States could opt for mobile missiles.[48] Mobile missiles would, indeed, complicate Soviet targeting. A multiple aim-point system, such as the horizontal shelter/loop road system currently selected for the MX, would require the Soviet Union to increase the warheads allocated to the US land-based missile system in order to cover the additional number of shelters in which a single missile might be housed. Assuming that, through SALT, limits on the number of warheads permitted either side can be maintained beyond SALT II, mobile systems might, indeed, assist in reducing vulnerabilities of the US land-based missile force.

Such an option, however, is complicated by two factors. First, the MX is not only mobile, but also a highly accurate system. Thus, the MX is likely to raise Soviet concerns over America's potential for preemptive attack, especially since the Soviet Union has invested more heavily in fixed-site ICBMs than has the United States. During peacetime, such concerns are likely to beget another round in the armaments race, thus further complicating progress in SALT. During crises, such concerns are likely to be destabilizing.

Second, if the purpose of mobile missiles is to avoid detection, then the introduction of mobile missiles may run counter to previously accepted means of verification. The verification problem might be partially solved if the United States, periodically (or on challenge), opens its shelters for inspection by Soviet satellites.[49] Under such conditions, the Soviet Union could verify the number of American ICBM launchers. However, in the absence of an agreement with the Soviets that they would do the same if they decide on a future deployment of mobile missiles, would the United States feel confident in its ability to verify a Soviet mobile missile system? Or would there be a concern that the Soviets might be tempted to increase their capabilities by secretly adding to their missile forces? Even in the absence of cheating on either side, an

agreement that cannot be verified by both sides is not likely to lead to an environment conducive to a reduction in tensions.

The problem, of course, is amplified by the fact that current SALT approaches focus on missile launchers not missiles. While the United States has produced some additional MM III's,[50] one knowledgeable observer has estimated that the Soviet Union has somewhere between 500 and 3,000 additional ICBMs.[51] Under current arms control agreements, such ICBMs, if fitted by the Soviets with warheads, could be placed into silos after launch of their first strike weapons, to be used at some later time or to be held in threat of use for coercive purposes. However, if the Soviets adopt a multiple aim-point system, additional ICBMs could be fitted to existing empty silos or launch points during a crisis and thus enhance Soviet "first-strike" capabilities. Such a case would not only be militarily threatened but destabilizing.

While it is beyond the scope of this paper to explore all potential alternatives for improving US strategic force invulnerability, it is clear that complex issues are involved. The United States must indeed be concerned over growing Soviet capabilities, but those capabilities as they now exist do not threaten to immediately upset the rough parity which has existed for over half a decade. There is time to assess carefully all aspects of suggested alternatives. There is time for further negotiations with the Soviet Union. Such negotiations not only might continue to focus on the reduction of strategic launchers and warheads, but also might focus on the desirability of mobile missiles as a means of reducing the vulnerability of ICBMs and on appropriate verification procedures for mobile missiles. Perhaps, negotiations might also include discussions of strategic doctrine as a means of avoiding an expansion of counterforce preemptive capabilities and improving stability of the strategic level.

ENDNOTES

1. See, for example, the four images of Soviet strategic policy offered by William D. Jackson in "The Soviets and Strategic Arms: Toward An Evaluation of the Record," *Political Science Quarterly*, Summer 1979, pp. 243-244.

2. For example, see Benjamin S. Lambeth, "The Evolving Soviet Strategic Threat," *Current History*, Vol. 69, October 1975, pp. 122-125; Paul H. Nitze, "Assuring Strategic Stability in an Era of Detente," *Foreign Affairs*, Vol. 54, January 1976, pp. 207-232; and Richard Pipes, "The Soviet Strategy for Nuclear Victory," *Commentary*, Vol. 64, July 1977, pp. 21-34.

3. See David Bender, "New CIA Estimate Finds Soviet Seeks Superiority in Arms," *New York Times*, December 26, 1976, p. 1.

4. See "New Assessment Put on Soviet Threat," *Aviation Week and Space Technology*, March 28, 1977. pp. 38-39.

5. *Ibid.*, p. 40.

6. Bender, "New CIA Estimate."

7. The so-called "Team B" members included Richard Pipes, Professor of Russian History at Harvard; Thomas W. Wolfe of the RAND Corporation; LTG Daniel O. Graham, retired former head of the Defense Intelligence Agency; Paul D. Wolfowitz of the Arms Control and Disarmament Agency; Paul H. Nitze, former Deputy Secretary of Defense; General John Vogt, USAF Retired, and Professor William VanCleve of the University of Southern California.

8. Bender, "New CIA Estimate."

9. *Ibid.*

10. "New Assessment Put on Soviet Threat," p. 40.

11. Pipes, p. 25.

12. *Ibid.*, p. 26.

13. *Ibid.*, p. 29.

14. *Ibid.*

15. *Ibid.*, pp. 30-31.

16. Fritz W. Ermath, "Contrasts in American and Soviet Strategic Thought," *International Security*, Vol. 3, Fall 1978, p. 140.

17. Colin S. Gray, "Force Postures, Arms Races, and the Future of SALT," Address before the University of Southern California/US Army Russian Institute Symposium, Garmisch, West Germany, December 1978.

18. *V. I. Lenin, Collected Works*, ed. and trans. by George Hanna, Moscow: Progress Publishers, 1965, Vol. 29, p. 153.

19. *Pravda*, March 13, 1954.

20. *Pravda*, December 22, 1952, cited in Jackson, "The Soviets and Strategic Arms," p. 247.

21. For example, see Michael MccGwire, "Soviet Strategic Weapons Policy, 1955-70," in *Soviet Naval Policy; Objectives and Constraints*, ed. by Michael MccGwire, Ken Booth, and John McDonnell, New York: Praeger Publishers, 1976, p. 488. See also Robert Legvold, "Strategic 'Doctrine' and SALT: Soviet and American Views," *Survival*, Vol. XXI, January/February 1979, pp. 8-13.

22. See Thomas W. Wolfe, "The Communist Theory of War," in *Marxism, Communism and Western Society*, ed. by C. O. Kernig, New York: Herder and Herder, 1973, Vol. 8, pp. 316-317.

23. For a sketch of the Soviet debate since the early sixties on the utility of nuclear warfare as an instrument of policy, see Raymond Garthoff, "Mutual Deterrence and Strategic Arms Limitations in Soviet Policy," *International Security*, Vol. 3, Summer 1978, pp. 113-125.

24. Ermath, p. 143.

25. Ambassador Gerald C. Smith, *SALT: The First Strategic Arms Negotiation*, reported in Garthoff, p. 126.

26. Dennis Ross, "Rethinking Soviet Strategic Policy: Inputs and Implications," *The Journal of Strategic Studies*, Vol. 1, May 1978, p. 6.

27. *Ibid.*, p. 9. For a detailed discussion of the concepts of deterrence through denial or punishment, see Glen H. Snyder, *Deterrence by Denial and Punishment*, Princeton: Center of International Studies, January 2, 1959.

28. Legvold, p. 8.

29. For example, see Henry Trofimenko, "The 'Theology' of Strategy," *Orbis*, Vol. 21, Fall 1977, pp. 498-500.

30. *Ibid.*, p. 497.

31. See George E. Lowe, *The Age of Deterrence*, Boston: Little, Brown and Company, 1964, pp. 94-253.

32. James R. Schlesinger, Secretary of Defense, *Annual Defense Department Report FY 1975*, Washington, DC: US Government Printing Office, March 4, 1974, p. 43.

33. Leonid Brezhnev's Speech at Tula, reported in Foreign Broadcast Information Service, *Soviet Union*, Vol. 18, January 1977, p. R9.

34. *Air Force Magazine*, March 1975, p. 73.

35. R. J. Rummel, "Will the Soviet Union Soon Have a First-Strike Capability?", *Orbis*, Vol. 20, Fall 1976, p. 579.

36. Harold Brown, Secretary of Defense, *Department of Defense Annual Report Fiscal Year 1980*, Washington, DC: Department of Defense, January 25, 1979, p. 5.

37. $KN = nY^{2/3}/CEP^2$ where n = number of warheads, Y = yield expressed in megatons, and CEP = circular error probable or the radius of a circle in which 50 percent of the warheads will land. See Kosta Tsipis, "The Physics and Calculus of Countercity and Counterforce Nuclear Attacks," *Science*, February 7, 1975, p. 396.

38. $Ks = 2(H)^{2/3} X [f(H)]^{2/3} [Ln (1-P)]$ where H = silo hardness and P = probability of destruction in percent. *Ibid.*

39. See Kosta Tsipis, "The Accuracy of Strategic Missiles," *Scientific American*, Vol. 233, July 1975, pp. 20-22.

40. R. J. Rummel, "Will the Soviet Union Soon Have a First-Strike Capability?" *Orbis*, Vol. 20, Fall 1976, p. 582.

41. R. J. Rummel, *Peace Endangered*, Beverly Hills: Sage Publications, 1976, p. 163 and pp. 135-142.

42. Indeed, if the United States were to upgrade its entire Minuteman III force with MK 12A warheads and NS-20 guidance systems and to upgrade the MM II with NS-20, I would *theoretically* have a sufficient countersilo kill capability to eliminate the entire Soviet ICBM fleet with over a 95 percent assurance of success.

43. Tsipis, *Scientific American*, July 1975, p. 20.

44. John D. Steinbruner and Thomas M. Garwin, "Strategic Vulnerability: The Balance Between Prudence and Paranoia," *International Security*, Summer 1976, p. 141.

45. Michael Nacht, "The Vladivostok Accord and American Technical Options," *Survival*, May/June 1975, pp 109-110.

46. Ermath, pp. 151-152.

47. If the Soviet Union were to launch an ICBM attack on US ICBMs and bombers, the alert bomber fleet would have sufficient warning to become airborne and survive the attack. If, on the other hand, the Soviets were to launch an attack with their short time-of-flight SLBM forces, the US ICBM force would survive since the Soviet Union does not currently have an SLBM hard target kill capability. In either case, coordinating such attacks with a determined attack on US SLBM forces would be an incredibly complex task.

48. In June 1979, the President decided to proceed with full-scale development of the MX missile program. Current planning calls for the deployment of 200 MX missiles in a mobile configuration. Each missile will be mounted in a transporter-erector launcher (TEL). Each TEL would have a deployment area consisting of 23 horizontal shelters interconnected with a loop-road. The TEL would be located in one of the 23 shelters.

49. The Department of Defense has already indicated its willingness to periodically open US ICBM shelters for inspection. See Dr. William J. Perry, "MX Mobile Basing," *Command Policy*, November 1979, p. 9.

50. See US Congress, House, *Department of Defense Authorized Appropriations for Fiscal Year 1979, Hearings Before the Committee on Armed Services*, 95th Congress, 2nd Session, Part 1, p. 117. In his statement before the committee William Perry, Undersecretary of Defense, Research, and Engineering, stated that the United States will produce about 40 MM III missiles without reentry vehicles in FY 1977. These missiles will not be used to increase the size of the MM III force, but will be stored as spares.

51. See Major General George Keegan, "New Assessment Put on Soviet Threat," p.46.

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This memorandum evaluates the contentions of a number of defense analysts concerning the strategic build-up of the Soviet Union. The author evaluates the arguments that the Soviet Union is seeking strategic superiority; the USSR will soon have the capability to execute a disarming first strike; and the appropriate US response to growing Soviet capability should focus on the continued improvement of counterforce capabilities and the development and deployment of mobile or multiple aim point land-based missiles. He concludes that the United States must be concerned over growing Soviet capabilities;

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however, time remains to assess carefully all aspects of suggested alternatives and to further negotiate with the Soviet Union.

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